



EFFECT OF AUDIO-VISUAL MATERIALS ON SENIOR SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN CHEMISTRY IN AGBANI EDUCATION ZONE ENUGU STATE

Iyida Nkiruka. J. & Prof Eze Charles U.

Department of Science Education,
Enugu State University of Science and Technology

ABSTRACT

The study investigated the effect of audio-visual materials (AVM) on senior secondary school students' achievement in Chemistry in Agbani education zone, Enugu State. Two research questions and two null hypotheses guided the study. Quasi-experimental non-equivalent control group design was adopted for the study. The sample size for the study was a total of 148 SS II chemistry students, (75 male and 73 female). One instrument, Chemistry Achievement Test (CAT) was developed, validated and reliability coefficient (.82) before using it for data collection. The research questions were answered using mean and standard deviation. The null hypotheses were tested at ($P < 0.05$) using analysis of covariance. The result of data analysis showed that there is a significant difference between the mean achievement scores of students taught using AVM and their counterparts taught without AVM; the students taught using AVM achieved more. Also there is a significant difference on the mean achievement scores of male and females taught using AVM. The female achieved higher than their male counterparts. Among the educational implications of the findings is that since use of AVM increased the achievement levels of students in chemistry, chemistry teachers should integrate its use in the teaching of chemistry. Among the recommendations made based on the findings is that in-service training's in the form of seminars and workshops should be organized by government and relevant professional bodies like STAN to educate and sensitize the teachers on the use of AVM for their lesson delivery

Keywords: Audio-visual materials, Chemistry, Achievement, Gender

INTRODUCTION

Chemistry is one of the major science subjects in the senior secondary school classes. It is the study of the properties and composition of matter and the changes which matter undergoes. It is concerned with the utilization of natural substances and the creation of artificial ones (Holman, 1995). Some branches of Chemistry include, Analytical Chemistry, Physical Chemistry, Agricultural Chemistry, Chemical Engineering, Geochemistry, Forensic Chemistry, among others. Chemistry is of immense importance for useful living in any society. It is pivotal to the production of resources necessary for socioeconomic, scientific and technological advancement needed for any nation. Within the context of science education, Chemistry has been identified as a very important school



subject and its importance in scientific and technological development of any nation has been widely reported especially in Nigeria where the national income rest on petroleum and petrochemical industries (Adesoji and Olatunbosun, 2018). The study of chemistry is pivotal to further studies in other areas of science in the university such as Pharmacy, Medicine, Biochemistry, Medical Laboratory Science, Engineering among others. This can be further illustrated by the fact that a science student must obtain a credit pass in Chemistry in external examinations (such as WAEC or NECO) before obtaining admission to study any of these courses. Chemistry is a subject which offers a lot of occupational opportunities in areas such as manufacturing of goods, analytical and consultancy services, health services, researching, consumer education among others. The study of Chemistry also equips individuals with skills to be self-employed and self-reliant because chemistry involves the use of process skills which are the pathways and strategies followed by the chemist in order to arrive at the products of science. Consequently, Chemistry has being recognized as an important tool in the development of individuals and the nation and hence it is among the core sciences in Nigerian educational system.

The realization of the goals of Chemistry in Nigeria has to some extent been impeded because the achievement of students in the subject in both internal and external examinations remains poor (Johnstone & Otis, 2006; Adesoji & Olatunbosun, 2008; Saage, 2009; Achor & Kalu, 2014). This situation if not properly curbed may hinder the development of the country in terms of science and technology. The poor achievement in chemistry is an indication that students have difficulty in learning and mastering chemistry concepts and applying these when they are under examination conditions. Fatokun, Egya and Uzoechi (2016) in their study observed that performance of students in Senior Secondary Certificate Examinations (SSCE) from 2011 – 2014 attested to students poor achievement in chemistry in external examinations. The situation did not improve hence the results of Chemistry students in WAEC from 2016- 2019 were not different from those of the previous years.

The persistent poor performance in the subject has been attributed to a number of factors, which include poor methods of instruction, teacher's attitude, laboratory inadequacy and poor science background (Are & Are, 2017). Nbina (2012) who investigated poor performance of senior secondary students in chemistry in Nigeria revealed that some of the variables that may be responsible for students' poor achievement in chemistry may be curricular related variables and instructional materials related variables. Eze and Egbo (2007) attributed the observed students' poor achievement in chemistry to the use of inappropriate or ineffective teaching strategy by chemistry teachers. Mari (2002) is of the opinion that teaching strategy is a variable that can easily be manipulated by teachers to increase students' retention rate and performance as well as reduce or eliminate sex-related difference in science performance.

Chemistry has often been adjudged to be a difficult subject by many students (Johnstone and Otis, 2006), due to its many abstract concepts which are central to further learning in both chemistry and other science subjects (Taber, 2002 in Uzezi, Danjuma,



Auwal, (2017)). These abstract concepts the authors noted are important because further chemistry/science concepts or theories cannot be easily understood if these underpinning concepts are not sufficiently grasped by the student. To make Chemistry less abstract to the students, the methods used in teaching it is of utmost importance. Chemistry should be taught in such a way that the students visualize and have first-hand experience of the contents being taught. By this, the subject becomes real to the students. This is why Udu (2018) suggested that science teachers should utilize innovative practices in their lesson delivery so as to enhance students' active participation in the lesson which will bring about an improved academic achievement.

The mastery of chemistry concepts might not be fully achieved without the use of instructional resources. The teaching of chemistry without instructional resources may certainly lead to poor academic achievement. Omosewa & Anasanya (2011) stressed that a professionally qualified science teacher no matter how well trained, would not be able to put his ideas into practice if the school lacks equipment and instructional resources that would enable him translate his competence into reality especially in difficult and abstract courses like chemistry. Well integrated instructional resources in a lesson would do much to supplement inadequacy of books as well as arouse students' interest by giving them something practical to see and do, and at the same time help them to think things out themselves (Jekayinfa, 1999 in Omabe and Akani 2015). Instructional resources are resources which assist teachers in the classroom to make the lessons explicit to learners. They are used to transmit information and ideas to learners. According to Usman and Adewumi (2006), instructional materials can be referred to as the wide variety of equipment and materials used for teaching by teachers to stimulate self-activity on the part of the students. They can be divided into three broad categories; the audio materials, the visual materials, and the audio-visual materials.

Audio-visual materials, according to Webster's Encyclopedia Unabridged Dictionary of English (2012), are "training or educational materials directed at both the senses of hearing and the sense of sight, which may include but not limited to films, recordings and photographs used in classroom instructions, library collections or the likes". Vikko (2003) describes audio visual materials as the instructional resources which uses the operations of the scientific and technological equipment combining both visual projections and sound productions to provide tangible experiences to learners. Some of such materials, the author noted, are computer assisted instructional materials, videotaped instructional materials and film shows/slides.

Several researches around the globe have investigated the use of audio – visual materials in teaching and learning. For instance, Akinwale(2015) investigated the effects of audio visual materials in the teaching and learning of speaking skills. Ashaver and Igyuve (2013) investigated the use of audio visual materials in the teaching and learning processes in colleges of education. The authors described audio-visual materials as materials with both audio and visual presentation to support teaching and learning particularly in improving comprehension and retention.



The importance of audio-visual materials in the teaching and learning of science is very profound, bringing many benefits to both the teacher and the learners. Audio-visual materials makes it possible for the learners to be familiar with the topic taught through the use of materials in which the learners can hear and see things for themselves (Akinwale, 2015). Audio-visual materials can play major roles in making learning permanent. Swank (2011) stressing the effectiveness of audio visual materials in learning estimates that about 40% of concepts are based upon visual experience, 25% upon auditory, 17% on tactile, 15% upon miscellaneous organic sensation and 3% upon taste or smell. Gopal (2010) in Shamsideen (2016) stresses that audio visual materials seem to facilitate the acquisition, retention and recall of concepts learned because they seem to evoke the maximum senses of the whole organism to the situations in which learning is done. The author also observed that the audio-visual materials provides significant gains in informal learning, retention and recall, rethinking and reasoning, activity, interest, imagination, personal growth and development . With the above assertion, it becomes clearer why audio-visual materials are important in the teaching and learning process. This is because it contributes to the clarity of information presented by allowing students hear and visualize what is learned thereby leading to higher achievement.

This study also determined the effect of audiovisual materials on gender on academic achievement. Gender disparity in science education has remained a matter of great concern to researchers. Nwagbo (2006) stated that apart from factors such as teaching method, and the teacher, gender is also implicated in students' achievement in science. Researchers have conflicting views on the effect of gender on academic achievement. While many researchers agree that there is no disparity in achievement in science between male and females (Offor 2012; Aniodoh & Offor, 2014; Adebule, & Ayoola, 2016), others believe that the males are higher achievers than the females. The later group see science and technology as a male-dominated discipline which females tend to shy away from (Longe & Adedeji, 2003). Fatokun, Egya and Uzoechi (2016) noted that in many Nigerian schools, female students are presumed to evade the study of chemistry due to several factors like psychological, motivational and interest. The males appear to have a natural positive attitude to science subjects while girls show negative attitude. This negative attitude appears to be due to the acceptance of the myth that boys are better in science subjects than girls. This narrative has changed in recent years as there seems to be an influx of females in science and technical disciplines. Aniodoh & Offor (2014) are of the opinion that if given the same opportunities, the females are high achievers as well as the male. Therefore, teaching methods that would benefit both genders should be adopted by the chemistry teachers. There is therefore the need to determine in this study if gender influences the achievement of students when taught using audio-visual materials.

The main purpose of this study was to determine the effect of audio visual-materials on Senior Secondary School Chemistry students' achievement in public schools in Agbani Education Zone of Enugu State.

Specifically, this study sought to determine the effect of audio-visual materials on:



1. students' achievement in Electrolysis in Agbani Education Zone of Enugu state.
2. male and female students' achievement in Electrolysis in Agbani Education Zone of Enugu state.

The Findings of this study has both theoretical and practical significance.

This study is theoretically justified by the fact that cognitive development occurs when there is an active interaction between the learners and the audio-visual materials such as videos, thereby facilitating the construction of the mental framework needed to not only sustain the learners' interest, but also enhance the retention of meaningful concepts. This means that the combination of visual and auditory learning modalities result in greater conceptualization by the learners with improved retention as posited by the cognitive theory of multimedia learning (CTML). In other words, the use of audio-visual materials in chemistry lessons is in conformity with the cognitive theory of multimedia learning (CTML) and the constructivist theory as it is particularly interested in the cognitive processes by which learners construct meaningful learning outcomes from words and pictures. The results of this study therefore will help in authenticating the tenets of Mayer and Piaget.

If well disseminated through its publication in journals and other academic outlets, the findings of this study would be of immense benefits to students, teachers, school authorities, curriculum planners, and researchers as well as state and federal ministries of education.

The study is delimited to the effect of audio-visual materials on students' achievement in chemistry in public secondary schools in Agbani Education Zone of Enugu State.

RESEARCH QUESTIONS

The following research questions guided the study:

1. What are the mean achievement scores of students taught Electrolysis using audio-visual materials with lecture and those taught Electrolysis using lecture method only?
2. To what extent do male and female students differ in their achievement in Electrolysis when taught with audio-visual materials and lecture method?

HYPOTHESES

The following null hypothesis were tested at .05 level of significance

- H₀₁:** There is no significant difference between the mean achievement scores of SS2 students taught Electrolysis using audio visual materials with lecture and their counterparts taught same with lecture method only.
- H₀₂:** There is no significant interaction of gender and method on SS2 students mean achievement scores in Electrolysis.



METHOD

The study is a Quasi-Experimental study of the non-equivalent control group type. This study was conducted in public secondary schools in Agbani Education Zone, which is one of the six education zones in Enugu state.

The population for the study consists of all co-educational public senior secondary two (SS2) students in Enugu South Local Government area of Agbani Education Zone of Enugu State, 2019/2020 academic session which consists of seven coeducational schools. They were seven hundred and eighty nine (789) SS2 students in the seven (7) co-educational schools. (Source, Post Primary School Management Board, PPSMB, 2019/2020).

The sample for the study consists of a total of one hundred and forty eight (148) students in two (2) out of the seven (7) co-educational schools in Enugu South Local Government Area of Agbani Education Zone. Seventy-five (75) of the students were male while seventy three (73) of the students were female. The sampling technique used for this study is the purposive sampling technique. This was purposefully used to sample two (2) public co-educational secondary schools which had more than one intact SS2 classes. In each of the sampled schools, simple random sampling technique (balloting) was used to sample two intact SS2 classes. One of the intact classes was used as the experimental group, while the other intact class was used as the control group.

The experimental procedure involved developing the experimental packages, training the research assistants and administering the instrument. The experimental package used for this study is videos on electrolysis, lesson plan and note. Videos (viewed through a laptop) were played at intervals during the lesson for the treatment groups while the control groups were taught without videos.

Data was collected with Chemistry Achievement Test (CAT) developed by the researcher which was used as pre-test and post-test.

In order to analyze the data, mean and standard deviation was used to answer the research questions while Analysis of co-variance (ANCOVA) was used to test the research hypothesis at .05 level of significance and 1 degree of freedom. ANCOVA was used in order to correct the error of initial difference in the ability levels among the students in the intact classes.

RESULTS

Research Question 1

What are the mean achievement scores of SS2 students taught Electrolysis using audio-visual materials with lecture and those taught Electrolysis using lecture method only?



Table 1: Mean achievement scores and standard deviations of SS2 students taught Electrolysis using AVM with Lecture and those taught using lecture method only.

Group	N	Pretest		Post test		Gain Score
		Mean	SD	Mean	SD	
AVM	75	4.08	10.3	32.9	7.20	28.8
Lecture	73	3.24	9.02	23.3	8.31	20.1

Result on Table 1 revealed that students taught electrolysis using AVM had a higher mean achievement score (32.9), with SD of 7.20, than those taught using lecture method only (23.3), and SD of 8.32. This shows that the use of AVM with lecture method enhanced the students' academic achievement in electrolysis than using the conventional lecture method only.

Research Question 2

What is the interaction effect of method and gender on SS2 students' achievement in Electrolysis?

Table 2: Mean and standard deviation scores on the effects of AVM on SS2 male and female students' achievement in Electrolysis

Gender	N	Pretest		Post test		Gain Score
		Mean	SD	Mean	SD	
Male	40	2.53	0.93	2.79	0.86	0.26
Female	35	2.54	0.76	3.59	0.65	1.05

From table 2 above posttest mean achievement scores and standard deviations of male students were 2.79 and 0.86 while female students were 3.59 and 0.65 respectively. Apparently, the AVM had a strong effect on achievement score of female students when compared with the posttest score of the male students. The female gained more achievement than the male with 1.05 gain score.

Hypothesis one

There is no significant difference between the mean achievement scores of SS2 students taught Electrolysis using audio visual materials with lecture and their counterparts taught same with lecture method only.

Result of the analysis of covariance for hypothesis one are presented in the table below.

**Table 3: Analysis of covariance (ANCOVA) for students means achievement score in Chemistry.**

Source	Type III sum of squares	Df	Mean square	F	Sig.	Decision
Corrected model	14118.91 ^a	1	14118.91	16.83	.000	S
Intercept	44971.36	1	44971.36	53.61	.000	S
Method	14118.91	1	14118.91	16.83	.000	S
Gender	40914.48	1	40914.48	117.48	.000	S
Interaction	40914.48	1	40914.48	117.48	.000	S
Error	256669.64	146	838.79			
Total	1225175.00	148				
Corrected Total	270788.55	147				

KEY: S is significant, NS is not significant

From Table 3, method gave an F value of 16.83 and this is significant at .000. Since .000 is less than 16.83 at .05 level of significance, the F value of 16.83 is significant. Null hypothesis one is therefore rejected as stated. This indicates that there is a significant difference between the mean achievement scores of students taught electrolysis using audio visual materials and that of their counterparts taught without audio visual materials. The difference is in favour of the experimental group.

Hypothesis Two

There is no significant interaction effect of gender and method on SS2 students mean achievement scores in Chemistry.

From Table 4, it is observed for gender that F – calculated value of (117.48) is significant. Since the computer significance of F (.00) is less than the .05 probability set for the study, the null hypothesis 2 is therefore rejected. This indicates that there is a significant interaction of gender and method on SS2 students mean achievement scores in Electrolysis in favour of the females

DISCUSSION

The results of the study showed that audio visual materials greatly improved students' achievement score in chemistry. Table one presented the mean achievement scores and standard deviation of the students in both groups in pretest and post-test. The fact that the mean post-test score of AVM differ from the mean post-test score of without AVM, this suggests that students taught using AVM achieved higher than their counterparts taught with only lecture method. The wide gap between the mean post-test scores of AVM and without AVM indicated that learning took place in AVM group is higher than those



without AVM group. Again, the standard deviations for both groups were equal. This shows that the level of existence of extreme scores is little. Hence the mean scores for the group taught with AVM is therefore a true representation of the achievement of the entire class.

The findings of this study lend credence to the report of Omebe and Akani (2015) who investigated into the effect of instructional resources on student's achievement in physics and chemistry in secondary schools in Ebonyi State, Nigeria and found out that physics students taught with instructional resources achieved higher and better than those taught without instructional resources. This is further supported by the works of Ibe and Abamu (2019) who reported in their findings that group exposed to lessons with Audio-visual technological integrated contents achieved higher in test scores than the group not exposed to.

Further investigation with the ANCOVA analysis revealed that there was significant difference on the mean achievement scores of male and females taught using audio visual materials. This shows that the difference between the mean achievement scores of male and female students taught with AVM is significant. The finding is in tandem with the result of Olasehinde (2018) who investigated the effect of video media instructional strategy on secondary school students' achievement in cell-division concept in Biology and found out that treatment has significant effect on male and female students achievement in Biology. However, Iorchugh (2006) showed no significant effect of gender on students' achievement in science.

Gender differences may have influenced the gap in the performance of boys and girls in Chemistry in particular and science as a whole at the senior secondary school level (Aniodoh and Offore 2014). It seems that female students now tend to avoid Chemistry and this may be responsible for the gap between female and male that offer Chemistry at the secondary schools.

CONCLUSION

Based on the findings of the study, the following conclusion was made

- Students taught using videos with lecture method (experimental group) achieved higher than the students that were not taught with videos (control group). This is also supported by the fact that there was a significant difference between the mean achievement scores of students taught using videos and their counterparts taught without videos in favour of the group taught using videos.
- Female students taught electrolysis using videos achieved higher than their male counterparts in the experimental group. The female gained more achievement than the male. This is not in agreement with hypothesis two which state that there is no significant interaction of gender and method on SS2 students mean achievement scores in Electrolysis.



Educational Implications of the findings

The result of the study some implications for stakeholders in science education like teachers, students, curriculum developers, government and policy makers.

The use of Audio Visual Materials (AVM) improved students' achievement in electrolysis. This suggests the need for chemistry teachers to adopt the use of AVM in teaching chemistry. It also implies that for advances in technology and science, teachers should incorporate videos that appeal to more than one sense organs. The teachers should endeavor to integrate AVM to teaching of chemistry. Teachers need to be aware of this method of instruction and employ it as strategy for effective teaching. They should use it as tool to disseminate results, assignments, lecture notes and scheme of work.

The result of the study also showed that female students developed higher achievement in chemistry than their male counterparts taught chemistry using AVM (videos). This implies that when given equal opportunities, the females are high achievers as well as their male counterparts, therefore, AVM (videos) should be employed in routine classroom teaching.

RECOMMENDATIONS

Based on the results obtained and discussed in this study, the following recommendations are hereby made:

- i. Integration of AVM into regular classroom instruction is recommended to chemistry teachers for the teaching of Chemistry in Senior Secondary Schools in order to improve academic achievement in Chemistry.
- ii. For effective integration of AVM into teaching methods, government should equip the schools with adequate AVM for teaching and learning.
- iii. Curriculum planners should incorporate AVM as instructional materials in the science curriculum.
- iv. Government and relevant professional bodies such as STAN should regularly organize in-service training programs for teachers' professional development on the effective integration and use of AVM such as (videos) in regular classroom lessons through seminars, workshops and conferences.

REFERENCES

- Achor, E. A. & Kalu, R. K. (2014). Incorporating error analysis approach into the teaching of practical chemistry in senior secondary schools in Makurdi Nigeria: any effect on achievement? *International Journal of Education and Practice*, 2(2), 21-34.
- Adebule, S.O & Ayoola, O.O.(2016) Impact of instructional materials on students' academic performance in Mathematics in secondary schools in Ekiti State, Nigeria. *Research Journal of Educational Studies and Review* 2 (1), 1-4, 2016 ISSN: 2449-1837 Research Paper <http://pearlresearchjournals.org/journals/rjesr/index.html>.



- Adesoji, F.A. & Olatunbosun, S. (2018). Students' teacher and school environmental actors as determinants of achievement in senior secondary school Chemistry in Oyo State, Nigeria. *The Journal of International Social Research*, 1(2).
- Akinwale O. I. (2015), The effects of audio-visual materials in the teaching and learning of the speaking skill in junior secondary schools, *International Journal of Social Science and Humanities Research* ISSN 2348-3164 (online) 3, (3), 50-58.
- Aniodoh, H.C.O & Offor, E.N (2014). Study of gender differences in secondary students achievement in chemistry. *Journal of Science and Computer Education*, 2, 231-242. Annual Conference, China. Retrieved from <http://repository.ied.edu.hk/>
- Are F. T & Are C. T (2017) Problems militating against effective teaching and learning of chemistry in secondary schools in Nigeria. *ISSN 1596-974X April, 2017-Multidisciplinary Journal of Research Development*, 26(2).
- Ashaver, D., & Igyuve, M. S. (2013). The use of audio-visual materials in teaching and learning process in College of Education Benue state, Nigeria. *Journal of Research and Method of Education*, 6(1), 44-55.
- Eze, A.E. & Egbo, J.J. (2007). Effect of concept mapping method of instruction on students' achievement and retention in chemistry. *Nigeria Journal of Functional Education* 5(1) 7-11.
- Fatokun K.V.F., Egya S. O. & Uzoechi B. C. (2016) Effect of game instructional approach on chemistry students' achievement and retention in periodicity *European Journal of Research and Reflection in Educational Sciences* 4(7), 2016 ISSN 2056-5852.
- Holman, J. (1995), *Chemistry London*: Thomas Nelson and Sons Ltd.
- Johnstone A. H., and Otis KH. (2006), Concept mapping in problem based learning: A cautionary tale. *Chemistry Education Research and Practice*, 7(2):84-95.
- Longe, R. S and Adediji, S. O., (2003). Increasing girls access to technical and vocational education in Nigeria.
- Mari, J.S. (2002). Gender related differences in acquisition of formal reasoning schematic, pedagogic implication of teaching chemistry using – based approach. *Journal of STAN* 37 (1 & 2) 76-80.
- Nbina, J.B. (2012). Teachers' competence and students' academic performance in senior secondary schools chemistry: is there any relationship? *Global Journal Of Educational Research* 11, NO. 1, 2012: 15-18
- Nwagbo, C. R., (2006). Effects of two teaching methods on the achievement and attitude to biology of students of different levels of scientific literacy. *International Journal of Educational Research*, 45, 216 – 229.
- Omebe C. A. & Akani O. (2015) Effect of instructional resources on student's achievement in physics and chemistry in secondary schools in Ebonyi State, Nigeria, *European Journal of Training and Development Studies*, 2,(2).56-65.
- Offor I.D (2012) women in national development. A struggle for status and fight against inequalities. *Journal of gender studies*. WOREJ 1 (1), 18 – 21.



- Omosewo, E, O. & Anasanya, S. A. (2011). Effect of improvised and standard instructional materials on secondary school teachers' academic performance in physics in Ilorin, Nigeria. *Singapore Journal of Scientific Research*, 1(1), 68-76.
- Saage, O. (2009). Causes of mass failures in mathematics examination among students a commissioned paper presented at government secondary school. Karu Abuja Science Day 1st March.
- Shamsideen, S.A. (2016). Impact of audio-visual materials in the dissemination of knowledge facilitators in some selected literacy centers in Oshodi/Isolo Local Government Area. *African Educational Research Journal*, 4(1): 19-24
- Swank, R. C. (2011). The educational function of university library. http://www.ideals.illinois.edu/bitstream/handle/2142/5455/library_trend University of Northern Iowa.
- Udu D.A (2018). Innovative practices in science education: a panacea for improving secondary school students' academic achievement in science subjects in Nigeria. *Global Journal Of Educational Research* 17, 2018: 23-30
- Usman, K. O & Adewumi, A. O., (2006). Factor responsible for inability of teachers to improvise instructional materials for the teaching of Physics. *Journal of Science Teachers Association of Nigeria (STAN)* 42, (1): 52-56.
- Uzezi J.G, Danjuma E., & Auwal, M.A (2017) Assessment of Conceptual Difficulties in Chemistry Syllabus of the Nigerian Science Curriculum as Perceived by High School College Students *American Journal of Educational Research*, 2017, 5, 7, 710-716
- Vikoo, B. (2003). Learning theories and instructional processes. Owerri: Springfield Publishers LTD. 4, (7), 1-4 . Retrieved from www.iiste.org.
- Webster's Encyclopedia Unabridged Dictionary of the English Language (2012) New York: Grammar Books. www.Globaljournalseries.Com; Info@Globaljournalseries.Com